

32



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/118,833	07/20/1998	TOSHIRO NISHI	0965-0232P-S	9403

2292 7590 01/15/2004

BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
FALLS CHURCH, VA 22040-0747

EXAMINER
----------

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
----------	--------------

1746

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/118,833

Applicant(s)

NISHI ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 4-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action is responsive to the amendment of October 24, 2003 and addresses claims 4-28 and newly added claims 29 and 30. Claims 4-28 remain rejected for the reasons of record, and claims 29 and 30 are newly rejected for these reasons. Furthermore, claim 29 is rejected under 35 USC §112, first paragraph. Accordingly, this action is made final.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 29 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 29 recites a sintering step which is performed at "about 1,300-1,500 °C." There is not believed to be sufficient support for the term "about" in the application as originally filed. Page 18, line 1 of the specification discloses that the powder is "burned for 2 hours at a temperature each of 1,300°C, 1,350°C, 1,400°C, and 1,500°C." The specification further states at page 6, line

Art Unit: 1746

11 that "this material can be burned not at a conventional high temperature of 1,600°C, but at a lower temperature of 1,300°C to 1,400°C as will be shown in Examples to be given later on." It is the Examiner's position that that these disclosures indicate specific, not approximate, temperature ranges to a skilled artisan, and therefore do not support a recitation of "about 1,300-1,500 °C." See *Eiselstein v. Frank*, 34 USPQ2d 1467 (CAFC 1995), which states, in part:

We are not unresponsive to the Commissioner's argument that the word "about" in a later added claim can broaden an original disclosure that indicates to one skilled in the art that his or her invention is to a precise, not an approximate, amount, range, or limit. Under such circumstances, the term "about" in the later added claim is new matter and may not receive the benefit of an earlier filing date. The meaning of the word "about" is dependent on the facts of a case, the nature of the invention, and the knowledge imparted by the totality of the earlier disclosure to those skilled in the art.

In view of the disclosure as a whole, it is believed that the term "about" in modifying the temperature is not adequately supported and thus constitutes new matter into the application.

#### ***Claim Rejections - 35 USC § 102***

4. Claims 4, 10-13, 21, 24, and 27-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Soma et al (U.S. Patent 5,411,767). Regarding claims 4, 10, 12, 28, and 30, Soma et al. teach a solid electrolyte type fuel battery having an interconnector comprising a material having the formula  $ABO_3$ , wherein A is preferably Ca, Ba, or Sr, and B is preferably Ti (see column 5, lines 13-38). Regarding claims 11 and 13, Soma et al. further teach a fuel electrode (1), an air electrode (3), an electrolyte (2), and a substrate (4) in Figure 1 and in column 6, line 50, et seq. Regarding claims 4, 10, 12, 28, and 30, as disclosed in column 2, lines 47-58, the interconnector is formed by plasma spraying followed by a heat treatment, which closes pores and microstructurally homogenizes the film. Thus, the heat-treatment step functions to "sinter"

the interconnector. Regarding claims 10 and 12, the reference teaches in column 2, lines 29-37 that the interconnector film is thermally sprayed onto a fuel or air electrode "raw" material, and then the interconnector film is heat-treated. The raw (i.e., green) fuel or air electrode films would inherently be sintered along with the interconnector film, thus resulting in a "co-sintered" or "integrally burned" interconnector. Regarding claims 24 and 27, the relative density of the interconnector is 95% or greater (see col. 9, line 61). Regarding claims 21 and 29, in Table 1, Soma et al. disclose that the interconnectors are heat treated at a temperature of 1400°C. It is further noted that claim 30 recites that the sintered material is formed "by a step consisting essentially of sintering the material after molding." While the Soma reference does not expressly teach this process, claim 30 is still a product-by-process claim that defines a product that is substantially identical to the product of Soma et al. Thus, claim 30 is also anticipated by Soma et al.

### *Claim Rejections - 35 USC § 103*

5. Claims 6, 8, 14-17, 22, 23, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soma et al (U.S. Pat. 5,411,767).

The reference is applied for the reasons stated in section 4 above. Regarding claims 6, 8, 14, and 16, in column 4, line 40 et seq., the reference teaches an interconnector material formula of  $(La_{1-x}D_x)_{1-u}B_{1-w}O_3$ , where  $D$  can be Ca, Sr, or Ba,  $B$  can be Ti (+Mg, +Nb),  $x$  is less than or equal to 0.3,  $u$  is greater than or equal to 0, and  $w$  is less than or equal to 0.1.

The reference does not expressly teach the same or overlapping subscript ranges for the  $(La_{1-x}D_x)_{1-u}B_{1-w}O_3$  compounds as recited in claims 6, 8, 14, and 16. For example, claims 6 and 14 provide for a  $Sr_{0.8}La_{0.2}TiO_3$  material, whereas the reference provides for a  $Sr_{0.09}La_{0.2}TiO_3$  material (when  $w=0$ ,  $x=0.3$ ,  $u=0.71$ ,  $D$  is  $Sr$ , and  $B$  is  $Ti$ ). Also, claims 8 and 16 provide for a  $Mg_{0.8}La_{0.2}TiO_3$  material, whereas the reference provides for a  $Mg_{0.8}La_{0.2}Ti_{0.2}O_3$  material (when  $x=0$ ,  $u=0.8$ ,  $w=0$ , and  $B$  is  $Ti_{0.2}Mg_{0.8}$ ).

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the claimed materials and prior art materials have substantially identical elemental compositions, and therefore could reasonably be expected to have similar properties. As such, the artisan may manipulate these subscript ranges so as to vary the necessary amounts of reagents, and thus optimize the production costs of the materials. If a prior art range and a claimed range do not overlap, obviousness may still exist if the ranges are close enough that one would not expect a difference in properties. *In re Woodruff* 16 USPQ2d 1934 (Fed. Cir. 1990); *Titanium Metals Corp. v. Banner* 227 USPQ 7723 (Fed Cir. 1985); *In re Aller* 105 USPQ 2233 (CCPA 1955). See also MPEP §2144.09.

6. Claims 4-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-50913 in view of Soma et al.

Regarding claims 4, 6, 8, 10, 12, 14, 16, 28, and 30, in the abstract, JP 8-50913 teaches a method of making a solid oxide fuel cell comprising the step of integrally sintering (burning) an air electrode (23) and an interconnector (24), which together comprise a support tube (22).

Regarding claims 11, 13, 15, and 17, the fuel cell further comprises a fuel electrode (26) and an electrolyte (25). Regarding claims 5, 7, 9, and 18-20, As shown in Figures 1 and 2, the interconnector is located at the top of the tube, thus providing for current collection from the fuel electrode through an adjacent interconnector in the "vertical" direction.

The Japanese reference does not expressly teach the material(s) which may comprise the interconnector (claims 4, 6, 8, 10, 12, 14, 16, 28, and 30), the temperature at which the sintering is performed (claims 21-23 and 29), or the relative density of the interconnectors (claims 24-27).

As set forth above, Soma et al. teach interconnectors having relative densities of at least 95% and which comprise perovskite materials that are not patentably distinct from the instantly claimed materials. In column 3, line 23, Soma et al. describe these materials as being "suitable for [an] interconnector." In Table 1, Soma et al. disclose that the interconnectors are heat treated at a temperature of 1400°C.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the courts have held that the selection of a known material based on its suitability for its intended use is *prima facie* obvious (MPEP §2144.07). Accordingly, the artisan would be motivated to use the species disclosed by Soma in the interconnector of the Japanese reference. Furthermore, the artisan would be motivated to use a sintering temperature of 1400°C in the manufacturing process of JP '913. In column 6, lines 44-49, Soma et al. teach that a heat treatment temperature of at least 1250°C for these materials is

“preferabl[e].” Therefore, the artisan would be motivated to perform the sintering step of JP ‘913 at a temperature of 1400°C.

Additionally, the recitation in instant claims 13, 15, and 17 that the electrodes, electrolyte, and interconnector are “laminated onto a substrate” is not considered to distinguish over the Japanese reference. As noted above, the reference identifies the combination of the air electrode and interconnector as a “support tube” (22), which itself functions as a substrate. Accordingly, it is seen that the “substrate” defined by the instant claims is integrally present in the fuel cell structure of the reference. Furthermore, it is noted that Soma et al. contemplate the interchangeability of a “true” substrate (4) and an “air electrode” substrate (13) in Figures 1 and 2 and in column 7, lines 3-10. Thus, these configurations are seen as functionally equivalent.

### *Response to Arguments*

7. Applicant’s arguments filed October 24, 2003 have been fully considered but they are not persuasive. Applicants assert, with regard to the heat-treatment step of Soma, that “[o]ne having ordinary skill would recognize that ‘heat treatment’ is a process that carries out an adjustment of the crystalline structure of the particles. In contrast, ‘sintering’ is a process that makes a tight bond between particles.” However, this assertion is not persuasive because it is not supported by sufficient evidence. It is well-settled that arguments of counsel cannot take the place of factually supported objective evidence. See, e.g., *In re Huang*, 100 F.3d 135, 139-40, 40 USPQ2d 1685, 1689 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir.



1984). Furthermore, Applicants have previously advanced a definition of "sinter" as "to bring about agglomeration (in metal particles) by heating" (Appeal Brief of 5/16/03, page 9). In column 2, line 47 et seq., Soma teaches a heat treatment step which results in the crystalline phases in the film becoming a homogeneous single phase so that the film is microstructurally homogenized and densified. Thus, the heat-treatment results in the agglomeration of the particles. Hence, the interconnector of Soma et al. is in fact "sintered," as provided for in the definition above.

Applicants further assert that Soma is non-analogous art to the present invention because "the field of endeavor of Soma is thermal spraying, which is in marked contrast to the sintering of the present invention." However, it is submitted that Soma is concerned with interconnectors for solid oxide fuel cells, which is the same field of endeavor as the present invention. Furthermore, Soma is also concerned with sintering, for the reasons set forth above. Accordingly, Applicant's argument that Soma is non-analogous art is not persuasive.

In response to Applicant's request for reconsideration of the declarations and unexpected results in the present application, the Examiner maintains the position that the declarations are not persuasive because they do not compare the process of Soma with the claimed process. The comparative fuel cell in the declaration is produced only by a thermal spraying step. The heat-treatment step disclosed by Soma is omitted. Furthermore, the materials used in the comparisons are not the inventive materials of Soma which are relied upon in the rejections. They are merely lanthanum chromite, a conventional material which is not germane to the instant claims. It is also noted that the declarations are only believed to be relevant to the rejections over the Soma reference alone and not to the rejection over JP '913 in view of Soma because JP '913 is not

concerned with a thermal spraying step. Accordingly, the declarations remain unpersuasive in overcoming the outstanding rejections.

### *Conclusion*

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

Art Unit: 1746

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Documents may be faxed to the central fax server at (703) 872-9306.

Jonathan Crepeau  
Patent Examiner  
Art Unit 1746  
January 8, 2004

*Bruce Bell*  
BRUCE F. BELL  
PRIMARY EXAMINER  
GROUP 1746